CERTS - Microgrid Laboratory Test Bed

Contract #: 500-03-024
Contractor: Lawrence Berkeley National Laboratory
Subcontractors: Northern Power Systems
Contract Amount: $2,955,000
Contractor Project Manager: Joseph Eto (510) 486-7284
Commission Contract Manager: Bernard Treanton (916) 654-4512
Status: Active

Project Description:
The objective of this project is to create the technologies and control strategies needed to capture the full potential of distributed energy resources to improve the reliability of the California interconnected power system via the Micro Grids concept. The objectives include:

- Consideration of control systems, including the sensors and instruments necessary to gather intelligence for real-time power management.
- Dispatch or coordination among distributed generation resources.
- Improved modeling techniques to better characterize the technologies and their impacts on the distribution system (and ultimately the transmission).

With correct placement and control, it should be possible to increase utility system reliability, lower the cost of power deliver, improve power quality, and reduce the environmental impacts of producing and transmitting electricity.

This contract is a follow-up of an existing micro-grid contract that evaluates the feasibility of the concept and included some bench scale testing of components. This contract involves the scaled up testing of all components, hardware, and control systems in a laboratory setting. This contract will involve two subcontracts: one is a micro-source manufacturer and the other is a Distributed Energy Resources (DER) engineering firm, they will provide 3 generators with modified inverters for use in the laboratory test bed demonstration. The initial phase of work will also require the DER engineering firm to develop and conduct factory tests for three modified inverters for the three 60 kilowatt (kW) generators that implement aspects of the Consortium for Electric Reliability Technology Solutions (CERTS) Micro-grid control algorithms. The second phase will place these three units at a utility laboratory test site to conduct a test demonstration.

At the present time LBNL has a contract in place with Northern Power. Northern Power manufactures DER equipment and inverters.

This project supports the PIER Program objectives of:

- Improving the energy cost/value of California's electricity by reducing grid loses and increasing kW injection.
- Improving the environmental, public health, and safety of California's electricity by increasing the use of renewable energy sources and by multiplying the number of generators.
- Improving the reliability, quality, and sufficiency of California's electricity by using Distributed Energy Resources to improve power quality and reduce the effect of power failure on the grid.

Proposed Outcomes:

1. Improve knowledge and integration of DER technologies to the grid.
2. Improve grid reliability and reduce end of line voltage sag.
3. Reduce the impact of grid power failure on utility's customers.

Project Status:

The project is active, on schedule and on budget.

- Although the project encountered a hurdle (lack of response from Capstone to supply micro-turbines), the project is expected to be completed on time by 12-31-2007. Technical work done on the inverter by Northern is almost completed and delivery of the equipment is expected by late summer 2005. LBNL is evaluating a new generator supplier and progress has been made to find a utility test site for the testing.
- LBNL is investigating three utility companies for potential micro-grid test sites.